
JOURNAL OF THE ARNOLD ARBORETUM

VOL. 56

JANUARY 1975

NUMBER 1

LAURACEAE HARDY IN TEMPERATE NORTH AMERICA

STEPHEN A. SPONGBERG

THE TREATMENT OF the five genera of Lauraceae presented below is an initial contribution towards a projected manual of cultivated ligneous plants, the preparation of which is a project of the Arnold Arboretum, and the purpose of which is to provide a modern, accurate account of woody plants encountered in cultivation in the cooler temperate regions of North America. It is planned that additional treatments of selected families, groups of families, individual genera, or taxa of other ranks will be published as they are completed. This decision has been made for several reasons. Through publication the information assembled will be made available immediately. It is hoped that errors, omissions, and supplemental information, particularly concerning hardiness, will be brought to our attention; moreover, we will welcome constructive criticisms and suggestions from our colleagues and other interested individuals. In addition, nomenclatural and taxonomic problems and proposals that would be inappropriate in the manual can be presented and discussed more easily in the pages of a botanical journal. It is also hoped that the periodic appearance of these treatments will stimulate further interest in the taxonomy, encourage continued investigations, result in additional collections, and promote further ornamental use of a wider variety of cultivated woody plants.

That there is a need for a modern manual of cultivated woody plants has become increasingly evident within the last decade. While the indigenous or spontaneous flora of most areas of North America is relatively well known and has been treated in numerous readily available regional and/or local manuals or floras, cultivated plants generally have not received equal attention. As a result, many of the species that comprise our cultivated flora are poorly known, and few manuals or guides that can be used to identify cultivated and exotic material are available. The absence of a modern, standard reference treating cultivated plants constitutes a noticeable gap in our total floristic knowledge of North America, especially since ornamental cultivated plants are prominent in the environment of our increasingly urbanized society. As a result of this prominence, not only has the American public become more interested in plants in general, but botanists, teachers, nurserymen, and professional and ama-

teur horticulturists, among others, have expressed need for an accurate and current reference dealing with the woody members of this large cosmopolitan group of plants.

As with any taxonomic study, our work in compiling a manual treating cultivated woody plants will be partially original, but it must be based upon and must draw information from previous scientific investigations and publications; the most recent North American work of the type now envisioned, and the model upon which our work will largely be based, was prepared by Alfred Rehder (1863–1949). Rehder's monumental contributions to our knowledge of the taxonomy of cultivated trees and shrubs are for the most part incorporated in his *Manual of Cultivated Trees and Shrubs Hardy in North America, Exclusive of the Subtropical and Warmer Temperate Regions*, which was written while Rehder was a member of the staff of the Arnold Arboretum, and in his *Bibliography of Cultivated Trees and Shrubs Hardy in the Cooler Temperate Regions of the Northern Hemisphere*. Since their publication, these two works have remained the standard references of their kind for the area covered. The work presently under way will attempt to update and correct the information included in Rehder's *Manual*. However, our current investigations will eventually result in a new manual, not a new, revised edition of Rehder's work.

The first edition of Rehder's *Manual* appeared in 1927 and was followed by a second, revised and enlarged edition in 1940. Currently in its twelfth printing, the *Manual* is available only periodically and never in great enough quantity to satisfy the continued demand. As a result, it has been increasingly difficult to obtain. The *Bibliography*, which gives complete bibliographic citations and almost complete synonymy for the names accepted in the second edition (including a few not in the *Manual*), was prepared at and published by the Arboretum during Rehder's retirement and appeared just before his death in 1949. The supply of copies, however, has long been depleted.

Since the publication of the second edition of the *Manual* and the *Bibliography* thirty-four and twenty-five years, respectively, have elapsed, and, as a consequence of numerous experimental and systematic studies published during these years, changes in the interpretations and understanding of many of the taxa treated in Rehder's works have resulted. Furthermore, the results of these studies have often necessitated nomenclatural changes. Additional nomenclatural alterations are required under the provisions of the current (1972) edition of the International Code of Botanical Nomenclature (Regnum Vegetabile vol. 82), since Rehder prepared the second edition and the *Bibliography* following the 1935 edition of the International Code. Moreover, expanded provisions for the nomenclature of cultivated plants, in particular, and the official adoption of the old concept but new term cultivar were incorporated in the 1953 edition of the International Code of Nomenclature of Cultivated Plants. The current edition of that code, which includes additional modifications, was adopted in 1969 (Regnum Vegetabile vol. 64).

These nomenclatural considerations and the advance of our knowledge

of many groups have often rendered Rehder's treatments of these groups outmoded and inaccurate. Also, the continued introduction into cultivation of new plants that are not treated in the second edition of the *Manual* (e.g., *Metasequoia*) has further diminished the usefulness of that work.

Our work, therefore, will be based on a complete re-examination of herbarium material and botanical and horticultural literature; living specimens will be studied whenever possible and herbarium specimens of cultivated plants will be studied and compared with specimens of the same taxa from their native areas. New information, such as chromosome numbers and indications of plants known to be poisonous to man, will be incorporated. Keys for identification will be strictly dichotomous throughout, and selected references to recent, as well as standard, taxonomic and horticultural publications will be included under families and genera to increase the usefulness and value of each treatment. Except when known for taxa new to cultivation, dates of introduction will not be included, nor will expanded references to illustrations, but it is hoped that the inclusion of drawings, at least for critical groups, will be possible.

Continuity with Rehder's works will be achieved, since it has been decided that all of the accepted taxa included in Rehder's *Bibliography* will either be treated or accounted for in the new manual. Taxa treated in Rehder's *Manual* and *Bibliography* for which no records in cultivation exist will be handled in one of two ways.¹ Either the name will be listed as undocumented in cultivation, or, if confusion exists between a taxon known in cultivation and an undocumented taxon, the undocumented taxon will be keyed and/or described in order to clarify its status and prevent continued confusion. Changes in taxonomic interpretation that result in the inclusion of taxa recognized by Rehder within the concepts of other taxa will be indicated by the addition of major synonymy.

Documentation will be based on three sources but except in rare instances will not be included in the treatments. Herbarium specimens will constitute the primary evidence of a taxon's occurrence in cultivation; yet literature reports (including selected nursery catalogs) and the published inventories of various botanical gardens and arboreta from within the range outlined below will also be accepted as valid. Several of the inventories to be consulted are available in computerized form from the Plant Records Center of the American Horticultural Society. It will be assumed that the published and inventory records are correct, and the names therein will be treated so that misidentifications, if they have occurred, can be corrected.

In determining which newly cultivated taxa are to be added to those included in Rehder's *Bibliography*, Rehder's broad concept of woodiness, outlined in the Introduction to the first edition of his *Manual*, will be employed. Additionally, documentation will be required from within an arbitrary range that roughly coincides with the area outlined in the seventh and eighth editions of Gray's *Manual*. Our area will include all

¹ For the most part, these taxa comprise Rehder's "related species" and those included in anticipation of their introduction and/or success in cultivation.

of northeastern North America west to the western boundaries of Minnesota, Iowa, and Missouri, and south to the southern boundaries of Missouri, Kentucky, and Virginia. In Canada, the western boundary will be a hypothetical line extending northward to the Arctic Ocean from the northwestern corner of Minnesota. Although this area is arbitrary and artificial, it has been defined for the following reasons. The majority of North American botanical gardens and arboreta in the Temperate Zone are located within this area. Secondly, the greatest representation of cultivated woody plants in the Arnold Arboretum herbarium is from the same region. Additionally, it will be feasible for us to visit major living collections within this area, and if new species of woody plants are in cultivation in temperate North America, it is expected that the majority will occur here.

Two problems, one of major concern to horticulturists and the second of interest and concern to both horticulturists and taxonomists, center around the potential range of species in cultivation and the treatment and concept of cultivar and ranks below the level of species. Both of these multifarious problems have received considerable attention and thought in the planning of the new manual and deserve mention here.

Plant hardiness is the factor most often considered in discussions of the potential range of cultivated woody species, and the information usually sought is the northern limit at which a particular species will tolerate the severity of winter climate. But when one considers northern species in cultivation, the question must also be asked from the reverse position, i.e., how far south will a northern species tolerate the changing, more southern environmental conditions. Additionally, a northern species grown primarily for its flowers may survive a southern Virginia winter, but the more southern climate and photoperiod may affect adversely or eliminate its ability to bloom and, therefore, also affect its ornamental value. The same circumstances in reverse may prove true for a southern species at more northern latitudes.

Only the repeated efforts of trial and error will determine with accuracy the possible ranges of species in cultivation, and the range of a particular species may require modification through the discovery of physiological and ecological variation within that species. As a consequence of such variation, nursery stock originating from seed collected from plants native to the Virginia Coastal Plain may not prove hardy in Boston, while plants of the same species grown from seed collected in the Mississippi Embayment region of Arkansas might flourish in the Arnold Arboretum.

With problems such as these in mind, it has been decided that the inclusion of zonal designations of hardiness will be postponed until publication of the treatments in manual form. Although the absence of these data will temporarily limit the usage of the published treatments, it is hoped that enough new data can be accumulated and tabulated from herbarium collections, botanical garden and arboreta inventories, commercial nursery offerings, and personal and communicated observations so that the final zonal designations in the manual will be more accurate

and dependable than if given provisionally now. It is also intended that a notation will be developed to include information for at least some species on "reverse hardiness" as well as "useful range." In our initial work towards these goals the Plant Hardiness Zone Map prepared by the United States Department of Agriculture (Miscellaneous Publ. No. 814. 1965) is being used for zonal designations. By allowing for more exacting designations due to zone subdivisions, this map has an advantage over previously published hardiness zone maps.

The primary intent of this work is to provide modern taxonomic treatments in manual form that will facilitate the determination of the botanical entities and provide the correct names of the genera and species of ligneous plants cultivated within our area. Thus, the treatment of cultivars is not a primary concern. Moreover, it would be impossible within the scope of the work presently envisioned to treat all of the cultivars now being grown. Such a work would necessarily be encyclopedic in length, and its value questionable, inasmuch as new cultivars, many of which replace and eclipse the popularity of other cultivars, are constantly being named and introduced.

Being without rank, cultivars may be selected from within a botanical taxon at any infraspecific rank, may comprise the entire ranked category, may cut across botanical categories of the same or a different rank, or may even cut across the limits of biological species, i.e., they may include elements of two distinct gene pools. When it can be determined that a named cultivar is coextensive with an accepted botanical taxon, or that a taxon as it is known in cultivation is represented primarily by a particular cultivar, we will attempt to list the correct alternative cultivar name. For some groups we will endeavor to indicate the characters that distinguish widely grown cultivars, and whenever known, published compilations of cultivars will be included under generic references.

In many instances horticulturally significant variations have been recognized in a botanical context, usually at the rank of *forma*. In those instances where evidence suggests that the plants comprising these categories are not worthy of taxonomic recognition, a cultivar name may be desirable so that the particular variants can be referred to in a horticultural context. In this respect, our concern with cultivars is primarily restricted, except as outlined above, to accounting for variants recognized by botanical combinations in Rehder's *Bibliography* but no longer considered worthy of taxonomic recognition. We have decided that in our treatments infraspecific taxa that are of dubious taxonomic status will be handled in a special manner. The correct botanical name will be given in a distinctive type face (SMALL CAPITALS), the presumed distinguishing characters will be stated, and the alternative cultivar name will be listed if one has been designated previously. The choice of name, either botanical or cultivar, is open and dependent upon the context in which the reader is working. If a cultivar name has not been proposed for the dubious taxon, we will not designate one. If in the future there is need for a cultivar name, we hope that one will be given in accordance with the then cur-

rent provisions of the International Code of Nomenclature of Cultivated Plants.

ACKNOWLEDGMENTS

The entire professional staff of the Arnold Arboretum is due thanks for freely given time and knowledgeable suggestions during the initial planning of the manual project. The responsibility for the final decisions based on the variety of opinions and diversity of viewpoints expressed during these discussions, however, is mine. For their continued help, advice, interest, and encouragement in the project, special thanks are extended to Drs. R. A. Howard, B. G. Schubert, C. E. Wood, Jr., and R. E. Weaver, Jr., and Mr. R. S. Hebb and Miss M. Gilmore. I am also indebted to Dr. E. A. Shaw, with whom I have had several constructive discussions concerning cultivars, and to Miss K. Clagett for editorial assistance.

Special thanks and gratitude are also extended to an anonymous donor whose generous gift to the Arnold Arboretum for this project has made and continues to make this work possible.

LAURACEAE A. L. de Jussieu, Gen. Pl. 80. 1789, nom. cons.

(LAUREL FAMILY)

Evergreen or deciduous trees or shrubs, the leaves, bark, and wood usually containing aromatic oils. Leaves exstipulate, simple, mostly alternate, entire, unlobed or occasionally lobed; venation pinnate or 3-veined from the base. Inflorescences usually axillary, cymose, racemose, or reduced and umbelliform, sometimes subtended by a deciduous involucre. Flowers small, perfect or imperfect (and the plants dioecious or rarely polygamodioecious). Perianth of (4 or) 6 yellowish or greenish tepals in 2 similar whorls, the tepals free nearly to the base, forming a very shallow perianth tube below. Stamens in 4 whorls of 3 stamens each, inserted on the rim of the perianth tube, 1 or more whorls often absent or reduced to staminodia; functional stamens of the third whorl usually associated with stalked or sessile glands; anthers 2- or 4-locular, introrsely to extrorsely dehiscent by valvular flaps. Ovary superior or \pm adnate to the perianth tube, 1-locular, with a single pendulous, anatropous ovule; style and stigma 1. Fruit a fleshy or rarely dry, usually indehiscent, 1-seeded drupe, the perianth tube (if persistent) and the pedicel often thickened to form a cupule beneath the drupe; seeds lacking endosperm, the straight embryo with large, fleshy cotyledons. TYPE GENUS: *Laurus* L.

Between 2,000 and 2,500 species in 30 to 40 genera, primarily of tropical and warm-temperate regions, particularly of Central and South America and eastern Asia. Several species of this family are the sources of well-known spices and herbs. Notable among those not mentioned below is

the cinnamon of commerce, the dried bark of *Cinnamomum zeylanicum* Nees and/or *C. cassia* Blume.

REFERENCES:

- HUTCHINSON, J. H. Lauraceae. Gen. Fl. Pls. 1: 125-243. 1964.
 KOSTERMANS, A. J. G. H. Lauraceae. Reinwardtia 4: 193-256. 1957. [General review of all aspects of the family.]
 ———. Bibliographia Lauracearum. xvi + 1450 pp. Bogor. 1964. [An alphabetical listing of Lauraceous taxa with references to the literature in which they have been treated and cited.]
 LIOU, H. Lauracées de Chine et d'Indochine: contribution à l'étude systématique et phytogéographique. xii + 226 pp. Paris. 1934. [Originally published in 1932 as a thesis presented to the Faculty of Science, University of Paris.]
 PAX, F. Lauraceae. Nat. Pflanzenfam. III. 2: 106-126. 1891.
 REHDER, A. Man. Cult. Trees Shrubs. ed. 2. Pp. 257-260, 901. 1940.
 ———. Bibliogr. Cult. Trees Shrubs, pp. 187-189. 1949.
 WOOD, C. E., JR. The genera of woody Ranales in the southeastern United States. Jour. Arnold Arb. 39: 296-346. 1958. [Lauraceae, 326-346; includes extensive bibliography as well as discussions of *Persea*, *Lindera*, and *Sassafras*.]

KEY TO GENERA OF LAURACEAE IN CULTIVATION

1. Inflorescence subtended and enclosed in bud by a deciduous involucre of bracts; flowers arranged in pedunculate or subsessile (often appearing fasciculate) umbelliform clusters. 2.
2. Umbelliform flower clusters distinctly pedunculate, the clusters subtended by an involucre of 5 or 6 caducous bracts; flowers perfect; anthers 4-locular. 1. *Umbellularia*.
2. Umbelliform flower clusters subsessile (often appearing fasciculate) to distinctly pedunculate, the clusters subtended by an involucre of 4 caducous bracts; flowers imperfect and the plants dioecious or occasionally polygamodioecious; anthers 2-locular. 3.
3. Perianth of 4 bractlike tepals in 2 whorls; staminate flowers with 12(-16) stamens, all associated with pairs of stipitate glands or rarely the outer 2 whorls eglandular. 2. *Laurus*.
3. Perianth of 6 petaloid tepals in 2 whorls; staminate flowers with 9 stamens, the outer 2 whorls eglandular, the inner whorl associated with pairs of stipitate glands. 3. *Lindera*.
1. Inflorescence neither subtended nor enclosed in bud by an involucre of bracts; flowers arranged in small racemes or pedunculate cymose or subumbelliform inflorescences. 4.
4. Plants deciduous; inflorescence a small raceme; flowers imperfect and the plants dioecious (or occasionally polygamodioecious); anthers 4-locular, dehiscing introrsely. 4. *Sassafras*.
4. Plants evergreen; inflorescence a pedunculate subumbel or cyme; flowers perfect; anthers 4-locular, the inner whorl dehiscing extrorsely, the outer whorls dehiscing introrsely. 5. *Persea*.

1. *Umbellularia* (Nees) Nuttall, N. Am. Sylva 1: 87. 1842.

Evergreen trees or shrubs with naked winter buds. Leaves strongly aromatic when bruised, short petiolate, alternate, involute in bud, pinnately veined. Flowers perfect, 4–5 mm. long, arranged in pedunculate umbelliform clusters in the axils of upper leaves or appearing to be in short, bracteate, terminal, compound-racemose inflorescences; each flower cluster enclosed in bud by a caducous involucre of 5 or 6 bracts. Perianth of 6, pale yellow, bractlike tepals. Functional stamens 9, the inner 3 with stipitate orange glands on each side of the filaments at base, alternating with an inner whorl of 3 scalelike staminodia; anthers 4-locular, the inner 3 with extrorse dehiscence, the outer 6 dehiscing introrsely. Ovary subglobose, small, tapering into a slender style; stigma capitate. Fruits subglobose or ovoid purplish-brown drupes borne on slightly thickened pedicels. (*Oreodaphne* subg. *Umbellularia* Nees, Syst. Laurin. 462. 1836.) TYPE SPECIES: *Tetranthera californica* Hooker & Arnott = *U. californica* (Hooker & Arnott) Nuttall. (Name Latin, diminutive of *umbella*, a little umbel.) — CALIFORNIAN LAUREL, OREGON MYRTLE, PEPPERWOOD.

A monotypic genus native to the Pacific Coast of North America.

REFERENCES:

- HOOKE, W. J. *Oreodaphne californica*. Bot. Mag. 88: t. 5320. 1862.
 KASAPLIGIL, B. Morphological and ontogenetic studies of *Umbellularia californica* Nutt. and *Laurus nobilis* L. Univ. Calif. Publ. Bot. 25: 115–240. pls. 7–28. 1951.
 SARGENT, C. S. *Umbellularia californica*. Silva N. Am. 7: 21, 22. pl. 306. 1905.
 STEIN, W. I. Silvical characteristics of California laurel (*Umbellularia californica*). U. S. Forest Serv. Pacific NW Forest Range Exp. Sta. Silvical Ser. 2: 16 pp. 1958.
 ———. *Umbellularia* (Nees) Nutt., California laurel. Pp. 835–839 in Seeds of woody plants in the United States. viii + 883 pp. Agr. Handb. No. 450. U.S.D.A. Washington, D.C. 1974.

1. *U. californica* (Hooker & Arnott) Nuttall, N. Am. Sylva 1: 87. 1842.

Aromatic trees or shrubs of various habit to 45 m., the trees usually with a dense crown of erect, slender branches; bark greenish to reddish brown. Leaves oblong to oblong-lanceolate, 3–8(–10) cm. long, 1.5–3 cm. wide, with obtusely acuminate apices and cuneate to subrounded bases; surfaces of the blades finely reticulate, shining dark green above, paler green and dull beneath. Flower clusters 1.5–2 cm. in diameter, with 4–9 flowers; involucre of caducous bracts leaving conspicuous scars at the summit of the peduncle. One, 2, or 3 subglobose or ovoid drupes developing per flower cluster, each drupe 2–2.5 cm. long, greenish, becoming brownish purple when mature. $2n = 24$. *Tetranthera* ? *californica* Hooker & Arnott; *Oreodaphne californica* Nees.)

Indigenous to the Pacific Coast of the United States from southwestern Oregon (Coos County) south to San Diego County, California, and occurring in both the Coast Ranges and the Sierra Nevada. Plants with the peduncles and lower surfaces of the leaves finely tomentulose have been recognized as var. *fresnensis* Eastwood (Leaf. West. Bot. 4: 166. 1945), while of the various growth forms, the trees with wide-spreading branches forming a crown broader than high and with slender pendulous branchlets have been designated as f. *PENDULA* Rehder (Jour. Arnold Arb. 1: 143. 1919). Often harvested and sold for flavoring in cooking as California bay leaf, the leaves of this species should not be confused with those of the true bay leaf, the foliage of *Laurus nobilis*.

2. *Laurus* Linnaeus, Sp. Pl. 1: 369. 1753; Gen. Pl. ed. 5. 173. 1754.

Evergreen shrubs or small trees with glabrous or pubescent reddish- or purplish-brown branchlets. Leaves ovate or obovate to narrowly elliptic, alternate, with pinnate venation. Flowers imperfect and the plants dioecious; flowers small, 3–4 mm. long, short pedicellate in pedunculate umbelliform clusters, the clusters occurring singly, fascicled, or in racemose inflorescences in the axils of leaves; each flower cluster subtended by an involucre of 4 deciduous bracts. Perianth of 4 yellowish, persistent, bractlike tepals in 2 whorls. Staminate flowers with 12 (rarely up to 16) stamens in 3 (or 4) whorls; filaments of all stamens associated with a pair of stipitate glands, or rarely the filaments of the first 2 whorls eglandular; anthers 2-locular, dehiscent introrsely. Carpellate flowers usually with 4 staminodia with sagittate filaments, often with small glands; ovary subglobose with a short style. Drupes ovoid, black, borne on the persistent and slightly enlarged perianth tube and pedicel. LECTOTYPE SPECIES: *L. nobilis* L.; typified by the removal of the other species attributed to *Laurus* by Linnaeus and their placement in other genera of Lauraceae. (Name an ancient one applied to the Laurel.) — LAUREL, SWEET BAY.

Two closely related species, *Laurus azorica* (Seub.) J. Franco (*L. canariensis* Webb & Berth.), $2n = 36$, of the Canary Islands and the Azores, and *L. nobilis* L. of the Mediterranean region, which is occasionally cultivated in our area.

REFERENCES:

- FERGUSON, D. K. On the taxonomy of recent and fossil species of *Laurus* (Lauraceae). Bot. Jour. Linn. Soc. 68: 51–72. pls. 1, 2. 1974.
GIACOBBE, A. Ricerche geografiche ed ecologiche sul *Laurus nobilis* L. Arch. Bot. Forli 15: 33–82. pls. 1, 2. 1939.
GIACOMINI, V., & A. ZANIBONI. Osservazioni sulla variabilità del *Laurus nobilis* L. nel bacino del Lago di Garda. Arch. Bot. Forli 22: 1–16. 1946.
KASAPLIGIL, B. Morphological and ontogenetic studies of *Umbellularia californica* Nutt. and *Laurus nobilis* L. Univ. Calif. Publ. Bot. 25: 115–240. pls. 7–28. 1951.
MARKGRAF, F. Lauraceae. In: G. HEGI, Illus. Fl. Mittel-Europa. ed. 2. 4(1): 12–15. 1958.

1. *L. nobilis* Linnaeus, Sp. Pl. 1: 369. 1753.

Evergreen shrubs or trees to 10 or rarely 20 m. with resinous winter buds, glabrous reddish-brown branchlets, and smooth brown or black bark. Petioles short, 3–6 mm. long, narrowly winged; leaf blades coriaceous, ovate to obovate or elliptic, (3–)5–10(–12) cm. long, (1.5–)2–4 cm. wide, with entire margins, acute to obtuse apices, and cuneate bases; both surfaces of the blades glabrous and finely reticulate, grayish green and shining above, pale and with the midvein elevated beneath. Flowers borne on finely pubescent pedicels in umbelliform cymose clusters, the clusters distinctly pedunculate, 1 to several in the axils of leaves or leaf scars. Drupes black and shining, ovoid to ellipsoid, 1–1.5 cm. long. $2n = 42$. — GRECIAN LAUREL, SWEET BAY.

Native to and characteristic of the Mediterranean region from Asia Minor west to Spain and Portugal. Cultivated since ancient times, this species is the laurel of mythology, history, and poetry and the source of bay leaf commonly used in cooking for flavoring. Easily trimmed into various shapes, the pruned plants are often grown in tubs for formal ornamental purposes. Aside from the typical form, f. *angustifolia* (Nees) Markgraf (in Hegi, Illus. Fl. Mittel-Europa ed. 2. 4(1): 15. 1958) (= cv. *Angustifolia*; var. *salicifolia* Hort.), with very narrow lanceolate leaves only 6–20 mm. wide, and f. *crispa* (Nees) Markgraf (loc. cit., 1958) (= cv. *Undulata*; var. *undulata* Meisner), with margins of leaf blades conspicuously wavy, may be encountered in cultivation.

3. *Lindera* Thunberg, Nov. Gen. Pl. 64. 1783, nom. cons.

Aromatic, deciduous or evergreen trees and shrubs, the leaves of deciduous species sometimes persistent over winter; buds absent or with few to numerous imbricated scales. Leaves petiolate, alternate to subopposite, unlobed with pinnate venation or 3-lobed and 3-veined from the base. Flowers imperfect and the plants dioecious or occasionally polygamodioecious; flowers small, yellow, short pedicellate in subsessile or short-pedunculate umbelliform clusters above the axils of leaves or of leaf scars; each flower cluster subtended by 4 deciduous bracts. Perianth of 6 or rarely more tepals in 2 whorls. Staminate flowers with 9 stamens in 3 whorls, the 3 innermost stamens with pairs of conspicuous stalked glands at the base of the filaments; anthers 2-locular. Carpellate flowers with stamens variously developed; ovary globose, with a short style. Fruits borne on slightly or obviously thickened pedicels, fleshy and indehiscent or dry and irregularly dehiscent. (*Benzoin* Schaeffer; including *Daphnidium* Nees, *Aperula* Blume, and *Parabenzoin* Nakai.) TYPE SPECIES: *L. umbellata* Thunberg. (Name commemorating John Linder, 1676–1723, an early Swedish botanist.)

A genus of about 100 species of temperate and tropical areas of eastern Asia and two species indigenous to the eastern United States. *Lindera*

triloba (Sieb. & Zucc.) Blume and *L. cercidifolia* Hemsley, both listed by Rehder, have been deleted from the present treatment since no documentation for their cultivation in our area has been found.

REFERENCES:

- ALLEN, C. K. Studies in the Lauraceae, III. Some critical and new species of Asiatic *Lindera*, with occasional notes on *Litsea*. Jour. Arnold Arb. 22: 1-31. 1941.
- BRINKMAN, K. A., & H. M. PHIPPS. *Lindera benzoin* (L.) Blume, spicebush. Pp. 503, 504 in Seeds of woody plants in the United States. viii + 883 pp. Agr. Handb. No. 450. U.S.D.A. Washington, D.C. 1974.
- NASH, G. V. *Benzoin aestivale*. Addisonia 5: 15, 16. pl. 168. 1920.
- SCHROEDER, E. M. Dormancy in seeds of *Benzoin aestivale* L. Contr. Boyce Thompson Inst. 7: 411-419. 1935.
- STEYERMARK, J. A. *Lindera melissaefolia*. Rhodora 51: 153-162. pl. 1151. 1949.

KEY TO THE SPECIES OF LINDERA IN CULTIVATION

1. Flowers appearing in spring before the leaves; plants deciduous, the leaves (or most of them) not persistent over winter. 2.
2. Pedicels and abaxial surfaces of the subtending bracts densely silky pubescent; leaf blades unlobed or 3-lobed, 3-veined from the base; drupes subglobose, black. 1. *L. obtusiloba*.
2. Pedicels and abaxial surfaces of the subtending bracts finely pubescent or glabrous; leaf blades unlobed with pinnate venation; drupes subglobose or ellipsoid, red, reddish brown, or rarely yellowish. 3.
3. Flower clusters subsessile, not noticeably pedunculate at anthesis, usually 4 clusters per node; drupes indehiscent, red, reddish brown, or rarely yellowish. 4.
4. Winter buds glabrous or \pm villous; pedicels of staminate flowers glabrous, pedicels of carpellate flowers 1-1.5 mm. long; drupes borne on slender pedicels 3-4 mm. long, not conspicuously enlarged at summit; mature drupes 8-10 mm. long. 2. *L. benzoin*.
4. Winter buds villous; pedicels of staminate flowers finely pubescent, pedicels of carpellate flowers 2.5 mm. long; drupes borne on stout pedicels 9-12 mm. long, conspicuously enlarged at summit; mature drupes 10-11.5 mm. long. 3. *L. melissifolia*.
3. Flower clusters distinctly stalked on peduncles 3-5 mm. long at anthesis, usually 2 clusters per node; drupes dehiscent into 5 or 6 irregular segments, yellowish. 4. *L. praecox*.
1. Flowers appearing in spring with the current season's leaves, the persistent foliage of the previous season, or the plants evergreen. 5.
5. Plants deciduous, the leaves dropping in fall or persistent over winter; terminal buds glabrous, with 3 or 4 imbricated scales. 6.
6. Leaves chartaceous, elliptic, oblong-elliptic, or oblanceolate, not persistent over winter; flower clusters distinctly pedunculate and umbelliform, the peduncles and/or pedicels densely silky pubescent. 7.
7. Branchlets yellowish brown with sessile winter buds; peduncles at anthesis 3-5 mm. long, glabrous; pedicels pubescent, in fruit 10-

- 12 mm. long; drupes red. 5. *L. erythrocarpa*.²
 7. Branchlets dark green with stipitate winter buds; peduncles at anthesis 4–8 mm. long, pubescent; in fruit, the pubescent pedicels 15–22 mm. long; drupes black. 6. *L. umbellata*.
 6. Leaves subcoriaceous, narrowly lanceolate to oblong, persistent over winter, falling in spring; flower clusters subsessile, often appearing fasciculate in the axils of the persistent leaves; pedicels sparingly pubescent. 7. *L. angustifolia*.
 5. Plants evergreen; terminal buds large with 8–10 silky-pubescent imbricated scales. 8. *L. megaphylla*.

1. *L. obtusiloba* Blume, Mus. Bot. Lugd.-Bat. 1: 325. 1851.

Shrubs or small, slender trees to ca. 10 m.; winter buds glabrous with 3 or 4 outer scales, the young branchlets pale yellowish green, often with conspicuous lenticels. Petioles pubescent, 1–2 cm. long; leaf blades 6–12 cm. long, 3–12 cm. wide, variable in shape, usually broadly ovate or subcordate with acute apices or 1–3-lobed, the lateral lobes short and obtuse, bases broadly cuneate or subcordate and 3-veined from the base; blades dark green and glabrescent above, pale bluish green and silky pubescent beneath, at least along the veins. Flowers borne on densely silky-pubescent pedicels in subsessile, umbelliform clusters, several clusters together in the axils of leaf scars from the previous season's leaves. Drupes black, subglobose, 7–8 mm. in diameter on pubescent pedicels ca. 1 cm. long. $2n = 24$. (*Benzoin obtusilobum* (Blume) Kuntze; *Lindera triloba* Hort., non (Sieb. & Zucc.) Blume.)

Native to eastern Asia in China, Japan, and Korea.

2. *L. benzoin* (L.) Blume, Mus. Bot. Lugd.-Bat. 1: 324. 1851.

Bushy, many-branched aromatic shrubs to 4.5 m. with small, glabrous, vegetative buds and larger, subglobose floral buds; young branchlets grayish black. Leaves short petiolate, the blades erect or ascending, becoming clear yellow in fall, oblong to obovate, 7–12 cm. long, 2–3.5 cm. wide, with acute or short-acuminate apices and cuneate bases; upper surfaces light green, pale green beneath. Flowers in dense, subsessile or sessile clusters, the clusters of staminate flowers ca. 5 mm. in diameter, larger than the clusters of carpellate flowers, usually several together above the scars of the previous season's leaves; carpellate flower clusters often single or paired at the nodes. Drupes scarlet, elliptic-oblong, 8–10 mm. long, 5–7 mm. wide, on slender pedicels 3–4 mm. long, not conspicuously enlarged at the summit, deciduous. $2n = 24$. (*Laurus benzoin* L.; *Benzoin aestivale* Nees.) — SPICE BUSH.

² Considerable taxonomic and nomenclatural confusion centers around *Lindera erythrocarpa*, *L. umbellata*, and other eastern Asiatic species of this group. Plants of the complex are variable, and the species are difficult to delimit; the treatment adopted here is essentially that of J. Ohwi, Fl. Japan, English ed., F. G. MEYER & E. H. WALKER, eds. 1965.

Widespread in eastern North America from Maine to southern Michigan and Illinois, southward to North Carolina, Kentucky, Missouri, and Kansas. Plants with finely pubescent branchlets, petioles, lower leaf surfaces (pubescent at least along the veins), and ciliate leaf margins have been recognized as var. *pubescens* (Palmer & Steyererm.) Rehder (Jour. Arnold Arb. 20: 412. 1939) (*Benzoin aestivale* var. *pubescens* Palmer & Steyererm.). More southern in distribution, var. *pubescens* extends into Florida and Texas. *Lindera benzoin* f. *xanthocarpa* (G. S. Torrey) Rehder (Jour. Arnold Arb. 20: 413. 1939) (*Benzoin aestivale* f. *xanthocarpa* G. S. Torrey), with yellow rather than red drupes, is known from wild populations in Massachusetts and is occasionally cultivated.

3. *L. melissifolia* (Walter) Blume, Mus. Bot. Lugd.-Bat. 1: 324. 1851.

Low deciduous shrubs to ca. 2 m., similar to the preceding but with villos winter buds and reddish brown branchlets. Petioles short, finely pubescent; leaf blades drooping, chartaceous, narrowly oblong, broadly lanceolate, or ovate, 5–15 cm. long, 1.5–6 cm. wide, with acute to acuminate apices, finely ciliate margins, and broadly cuneate, rounded, or obtuse bases; blades green, smooth and glabrous above, finely reticulate and pubescent, particularly along the elevated midvein, beneath. Flowers in dense, sessile clusters, usually several clusters together above the leaf scars of the previous season's leaves. Mature drupes red, elliptic-oblong, 10–11.5 mm. long, 7–8 mm. wide, borne on pedicels 9–12 mm. long, the pedicels conspicuously enlarged at the summit and persistent. (*Laurus melissaefolia* Walter.)

One of the rarest native North American shrubs, known from a few scattered localities from Florida to Louisiana and northward to eastern North Carolina, Arkansas, and southern Missouri; known in cultivation at the Henry Foundation for Botanical Research, Gladwyne, Pennsylvania. See Steyermark (1949) for a valuable discussion and comparison of this species and its close ally, *L. benzoin*.

4. *L. praecox* (Siebold & Zuccarini) Blume, Mus. Bot. Lugd.-Bat. 1: 324. 1851.

Deciduous shrubs or small trees of bushy habit to 8 m.; vegetative buds small, conical, with 3 or 4 scales, floral buds globose; branchlets dark brown or silvery brown with conspicuous white lenticels when young. Leaves chartaceous, with petioles 1–2 cm. long; leaf blades elliptic, ovate, or broadly ovate, 4–9 cm. long, 2–5 cm. wide, with acute apices and broadly cuneate to subrounded bases; blades green above, glaucescent, often with soft hairs along the veins beneath. Flowers borne on short finely pubescent pedicels in small umbelliform clusters, the clusters on peduncles 3–5 mm. long, 2 or 3 clusters per node. Fruits dry, subglobose, 1.5–2 cm. in diameter, yellowish or yellowish brown, borne on thickened pedicels ca. 1 cm. long and dehiscing into 5 or 6 irregular segments to expose the single

seed. $2n = 24$. (*Benzoin praecox* Sieb. & Zucc.; *Parabenzoin praecox* (Sieb. & Zucc.) Nakai.)

Indigenous to Japan where it is relatively common in mountainous regions. Along with a few other Asiatic species of *Lindera*, *L. praecox* has been segregated into the genus *Parabenzoin* by Nakai because of its dry fruits that dehisce into five or six irregular segments. Carpellate plants are rarely encountered in cultivation, probably because their flower clusters are smaller and less showy than those of staminate plants.

5. *L. erythrocarpa* Makino, Bot. Mag. Tokyo 11: 219. 1897.

Large deciduous shrubs to ca. 6 m. (?) with yellowish brown branchlets and sessile winter buds. Petioles 6–10 mm. long; leaf blades chartaceous, oblanceolate to oblong, 6–13 cm. long, 1.5–2.5 cm. wide, with acute or \pm obtuse apices and cuneate bases; upper surfaces of the blades glabrous, dark green, the lower surfaces glaucescent with sparse deciduous pubescence. Flowers borne on pubescent pedicels in pedunculate, umbelliform clusters, the glabrous peduncles 3–5 mm. long. Drupes red, globose, 5–6 mm. in diameter, on pedicels 10–12 mm. long.

Native to China, Korea, and Japan; reported in cultivation at Longwood Gardens.

6. *L. umbellata* Thunberg, Nov. Gen. Pl. 64. tab. 1783.

Erect deciduous shrubs or small trees to ca. 3 m. with dark green branchlets and short stipitate winter buds. Leaves thinly chartaceous with slender petioles 10–15 mm. long; blades narrowly oblong to ovate-oblong, 5–9 cm. long, 1.5–3.5 cm. wide, with acute apices and cuneate bases; blades glabrous above, the lower surfaces whitish pubescent when young, becoming glabrous. Flowers borne on pubescent pedicels in pedunculate umbelliform clusters, the pubescent peduncles 4–8 mm. long. Drupes black, globose, ca. 6 mm. in diameter, on pedicels 15–22 mm. long. (Including *L. umbellata* var. *hypoglauca* (Maxim.) Makino; *L. hypoglauca* Maxim.)

Native to China and Japan.

7. *L. angustifolia* Cheng in C. P'ei, Contr. Biol. Lab. Sci. Soc. China, Bot. Ser. 8: 294. fig. 21. 1933.

Deciduous shrubs to ca. 3 m. (?) with small conical vegetative buds and larger, subglobose floral buds; young branchlets reddish brown or reddish green. Leaves short petiolate, subcoriaceous, oblong to narrowly lanceolate, 5–10 cm. long, 1–2.5 cm. wide, with acute apices and cuneate bases; blades dark shining green above, pale green and glaucous below, turning pastel shades of orange and pink in fall; leaves persistent over winter and deciduous after anthesis in spring. Flowers on distinct, sparse-

ly pubescent pedicels in subsessile umbelliform clusters, several clusters together in the axils of the persistent leaves. Drupes black at maturity, globose, 5–6 mm. in diameter, borne on persistent pedicels, 1–1.5 cm. long, terminated by small discs or cupules, the drupes often appearing fasciculate on the branchlets.

Native to Central China. This species, not previously recorded as cultivated in our area, has promise as an ornamental plant, particularly since its foliage turns attractive pastel shades of pink and orange in fall and persists on the shrubs over winter. Specimens of this species (some misidentified as *Lindera umbellata* var. *hypoglauca*, others unidentified) have been examined from the Barnes Arboretum, the Garden Center of Greater Cleveland, and the Cole Nursery Company, Inc.; it is apparently also grown at the Holden Arboretum.

8. *L. megaphylla* Hemsley, Jour. Linn. Soc. Bot. 26: 389. 1891.

Evergreen shrubs or small trees to 20 m.; branchlets purplish brown or purplish black with scattered white lenticels and large terminal buds 1–2 cm. long with numerous, finely white-pubescent, imbricated scales. Petioles 1–2.5 cm. long; leaf blades coriaceous, oblong to oblanceolate, 6–20 cm. long, (1.5–)2.5–6 cm. wide, with acuminate apices and cuneate bases; upper surfaces dark green and lustrous, the midveins prominently elevated on the dull green, glaucous, and glabrous or finely pubescent lower surfaces. Flowers borne on densely silky-pubescent pedicels in pedunculate umbelliform clusters above the axils of the leaves or leaf scars. Drupes black, globose to ovoid, ca. 1.5 cm. long, on stout pedicels ca. 1 cm. long; the pedicels terminated by discs ca. 8 mm. in diameter. (*Benzoin grandifolium* Rehder.)

Native to Taiwan, southern and southwestern China.

4. *Sassafras* T. F. L. Nees & Ebermaier, Handb. Med.-Pharm.
Bot. 2: 418. 1831.

Dioecious deciduous trees with thick, furrowed bark; winter buds with several imbricated scales. Leaves petiolate, involute in bud; leaf blades ovate to elliptic in outline, unlobed or 1–3(–5)-lobed at apex, with a prominent midvein and 2 prominent lateral veins from near the base. Flowers appearing before the leaves and/or as the leaves expand in spring, imperfect (or occasionally appearing perfect, but functionally imperfect), arranged in lax, drooping, several-flowered racemes in the axils of the scales of terminal buds. Perianth yellowish green, 6-parted nearly to base. Staminate flowers with 9 stamens in 3 whorls, each stamen of the inner whorl with a pair of stalked glands at the base of the filament; anthers 4-locular (2-locular in one species not in cultivation) with introrse dehiscence; staminodia and pistillodia variously present or absent. Carpel-

late flowers with a rudimentary androecium of 6 stamens or 9 stamens and 3 staminodia; ovary ovoid, the slender style terminated by a slightly expanded stigma. Fruit an ovoid, dark blue drupe borne on the club-shaped, enlarged, fleshy pedicel and perianth base. (Including *Pseudosassafras* Lecomte.) TYPE SPECIES: *Laurus sassafras* L. = *S. albidum* (Nuttall) Nees. (Name apparently a vernacular one used by early European settlers in Florida and later adopted by Trew.) — SASSAFRAS.

Three species, of which two, *Sassafras tsuma* Hemsley of China and *S. randaiense* Rehder of Taiwan, are not known in cultivation, while the third, *S. albidum*, is widely distributed and sometimes cultivated in the eastern United States and southern Canada.

REFERENCES:

- BONNER, F. T., & L. C. MAISENHOLDER. *Sassafras albidum* (Nutt.) Nees, sassafras. Pp. 761, 762 in *Seeds of woody plants in the United States*. viii + 883 pp. Agr. Handb. No. 450. U.S.D.A. Washington, D.C. 1974.
- FERNALD, M. L. Nuttall's white sassafras. *Rhodora* 15: 14-18. 1913.
- . The nomenclature of *Sassafras*. *Ibid.* 38: 178, 179. 1936.
- KENG, H. A taxonomic revision of *Sassafras* (Lauraceae). *Quart. Jour. Taiwan Mus.* 6: 78-85. 1953.
- REHDER, A. The American and Asiatic species of *Sassafras*. *Jour. Arnold Arb.* 1: 242-245. 1920.
- SARGENT, C. S. *Sassafras*. *Silva N. Am.* 7: 13-18. pls. 304, 305. 1905.

1. *S. albidum* (Nuttall) C. G. Nees, *Syst. Laurin.* 490. 1836.

Trees to 20 m. or rarely to 38 m., often suckering from the roots and forming colonies; branchlets and buds glabrous and glaucous, the bark on young branchlets green or brownish; leaves and bark aromatic. Petioles 1.5-3 cm. long; leaf blades ovate to elliptic, 8-12(-18) cm. long, 2-8 cm. wide, cuneate at base, unlobed or usually 1-3-(rarely 4- or 5-)lobed, characteristically mitten-shaped, the lobes subacute or obtuse; upper surfaces bright green, glabrous and glaucous beneath; foliage becoming bright orange or yellowish in fall; leaf scars with a single, linelike bundle scar. Flowers in small racemes 3-5 cm. long; staminate flowers with 9 stamens, the anthers 2-locular; staminodia and pistillodia absent; carpellate flowers with 6 rudimentary stamens in 2 whorls. Drupes ovoid, ca. 1 cm. long, borne on bright red fleshy pedicels. $2n = 48$. (*Sassafras officinale* Nees & Eberm. var. *albidum* Blake.)

Widespread in eastern North America from southern Maine and southern Ontario to Iowa and southward to Florida and Texas. Plants with finely pubescent or puberulent branchlets and the mature leaves silky pubescent beneath have been recognized as var. *molle* Fernald (*Rhodora* 38: 179. 1936) (*Sassafras officinale* Nees & Eberm.; *S. variifolium* (Salisb.) Kuntze). This variety is generally of more southern distribu-

tion than var. *albidum*. Recently, f. *moldenkei* Oswald (Phytologia 7: 321. 1961) (plants with leaves pubescent beneath and the branchlets bright red purple instead of green or brownish) has been described from Long Island, and if introduced into cultivation may become valuable as an ornamental. It should be noted, however, that *S. albidum* is a very difficult species to transplant.

Filé, a powder prepared from the dried, young, mucilaginous leaves and pith, sometimes mixed with thyme, is used to thicken gumbo and as a condiment in the southern United States. Sassafras tea is brewed using the bark of the roots, while an oil used to flavor carbonated beverages (root beer) is obtained from the roots and bark.

5. *Persea* Miller, Gard. Dict. Abr. ed. 4. 1754, nom. cons.

Evergreen trees and shrubs with naked buds. Leaves petiolate, revolute in bud, chartaceous to coriaceous, pinnately veined, and usually pubescent. Flowers perfect, arranged in pedunculate, cymose or subumbelliform inflorescences in the axils of leaves. Perianth lobes 6, nearly free to the base, hairy, persistent in fruit. Androecium of 9 functional stamens and 3 inner staminodia, the first 2 whorls of functional anthers with introrse dehiscence, the third whorl with extrorse dehiscence; anthers 4-locular; filaments with paired stalked or basally sessile glands. Ovary subglobose, the style slender and often pubescent. Drupes baccate, small and subglobose or globose or large and ellipsoid, sometimes fleshy, borne on the spreading, persistent perianth lobes. (*Borbonia* Miller; *Tamala* Raf.) TYPE SPECIES: *P. americana* Miller. (Name an ancient one used by Theophrastus for an oriental tree and later adopted by Linnaeus.) — SWEET BAY.

Approximately 150 species primarily of tropical America but extending southward to Chile and northward to Delaware and Arkansas; one species in the Canary Islands. As accepted here, two species are infrequently cultivated in our area, while outside our region additional species are native to the southeastern United States, and *Persea americana* Miller, the American avocado, and its var. *drymifolia* (Schlecht. & Cham.) Blake, the Mexican avocado, are cultivated in warmer regions of the United States and often grown as house plants.

REFERENCES:

- FERNALD, M. L. Botanical specialties of the Seward Forest and adjacent areas of southeastern Virginia. *Rhodora* 47: 93-142, 149-182, 191-204. 1945. [Discussion of *Persea borbonia* and *P. palustris*, 149-151.]
KOPP, L. E. A taxonomic revision of the genus *Persea* in the Western Hemisphere (Perseae — Lauraceae). *Mem. N. Y. Bot. Gard.* 14(1): 1-117. 1966.
SARGENT, C. S. *Persea Borbonia* and *Persea pubescens*. *Silva N. Am.* 7: 4-8. pls. 301, 302. 1905.

WOFFORD, B. E. A biosystematic study of the genus *Persea* (Lauraceae) in the southeastern United States. Diss. Abstr. 34(11): 5354-B. 1974. [Ph.D. dissertation, University of Tennessee. 1973.]

———. The systematic significance of flavonoids in *Persea* of the southeastern United States. Biochem. Syst. Ecol. 2: 89–91. 1974.

KEY TO THE SPECIES OF PERSEA IN CULTIVATION

1. Peduncles shorter than the petioles of the leaves subtending the inflorescences; pubescence of branchlets and leaves appressed. 1. *P. borbonia*.
1. Peduncles longer than the petioles of the leaves subtending the inflorescences; pubescence of branchlets and leaves crisped and erect. 2. *P. palustris*.

1. *P. borbonia* (L.) Sprengel, Syst. 2: 268. 1825.

Shrubs or small trees to ca. 12 m. with thick, deeply furrowed, aromatic bark; branchlets reddish brown with angular tips and sparse to dense appressed pubescence. Petioles 1–3 cm. long, the leaf blades coriaceous, elliptic to lanceolate, 4–10(–13) cm. long, 1–4(–6.5) cm. wide, with acute to rounded apices, remotely revolute margins, and cuneate bases; both surfaces thinly pilose when young, bright green, lustrous, and becoming glabrous above, pale green, often appearing glabrous but sparsely appressed pubescent with coppery-brown hairs, primarily along the veins, below. Flowers inconspicuous, 3–3.5 mm. long, in pedunculate, several-flowered cymes, the peduncles slender, 0.8–2.5 cm. long, shorter than the petiole of the subtending leaf. Drupes subglobose, 8–12 mm. in diameter, black, glaucous, borne on reddish pedicels. $2n = 24$. (Excluding *P. humilis* Nash; including *P. littoralis* Small.) — RED BAY.

Native to the Coastal Plain and Piedmont of the southeastern United States from North Carolina to Florida and westward into Texas.

2. *P. palustris* (Rafinesque) Sargent, Bot. Gaz. 67: 229. 1919.

Shrubs or small trees to 15 m. with thin, fissured, gray bark; branchlets angular, reddish brown, densely to sparsely pubescent with crisped, erect, rusty-brown hairs. Petioles 0.8–2.5 cm. long, the leaf blades subcoriaceous to coriaceous, obovate, ovate, or lanceolate, (5–)6.5–18 cm. long, 1.5–5.5 cm. wide, with acute to slightly rounded apices, remotely revolute margins, and cuneate bases; upper surfaces glabrescent, lustrous green, lower surfaces grayish white, finely pubescent with rusty-brown, crisped hairs, particularly along the veins. Flowers small, 4.5–5 mm. long, in pedunculate, several-flowered cymes, the peduncles slender, 1–7.5 cm. long, usually longer than the petioles of the subtending leaves. Drupes subglobose to ellipsoid, 7–8 mm. in diameter, black. $2n = 24$. (*P. borbonia* f. *pubescens* (Pursh) Fern.; *P. pubescens* (Pursh) Sarg.; *Laurus caroliniensis* β *pubescens* Pursh; *Tamala palustris* Raf.) — SWEET BAY, RED BAY, SWAMP BAY.

Native to the Coastal Plain from southeastern Virginia to southern Florida and west into Texas; also known from the Bahama Islands.

ARNOLD ARBORETUM

HARVARD UNIVERSITY

CAMBRIDGE, MASSACHUSETTS 02138

AND

JAMAICA PLAIN, MASSACHUSETTS 02130